

Bracing For The Paraplegic Patient

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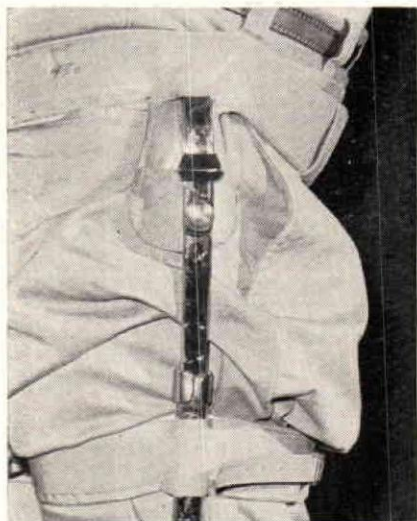


Figure I—The hip joint showing attachment to the pelvic band and the ring lock.



Figure II—The knee joint, demonstrating the ring lock and the thigh and calf cuffs and the knee pad.

We have a "rule of the thumb" that patients with paraplegia at the level of D-10 and above will need long leg braces, pelvic band and Knight spinal attachment. Below D-10, the patient can usually get along with long leg braces with a pelvic band, and, depending upon the amount of return, we may use long leg braces alone. If there is sufficient musculature around the hip and knee, only short leg braces are prescribed to take care of a dropped foot.

Braces should be fitted to the patient with careful attention to any pressure points, for many paraplegic patients have no sensation and their skin is apt to break down with decubitus ulcers. At the same time, the braces should be fitted snugly to the human form in order to be as neat as possible.

Hip (Figure I) and knee (Figure II) joints are usually fitted with ordinary ring or drop lock. Some patients have used the Swiss lock at the knee joint for years and like it. We ordinarily would not try to change it if the patient is used to it and likes it. But, if original braces are being prescribed, we use the simple ring lock. Patients with adductor spasm should not be fitted with Swiss locks for they are apt to trip the knee lock inadvertently.

Braces should be as physiological as possible. We feel that when a patient is standing in his braces, his hip joint should be over the knee joint, and his knee joint over the ankle joint. Looking at the patient laterally, all joints should fall on a straight vertical line at a right angle to the floor.

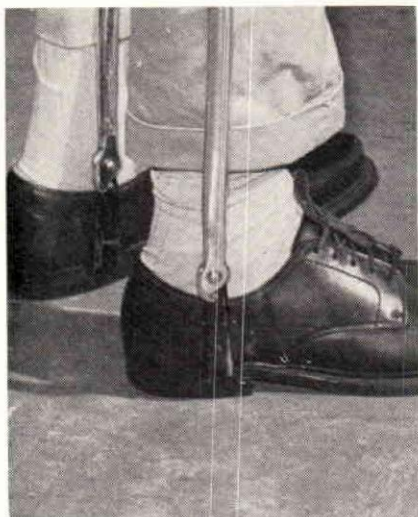
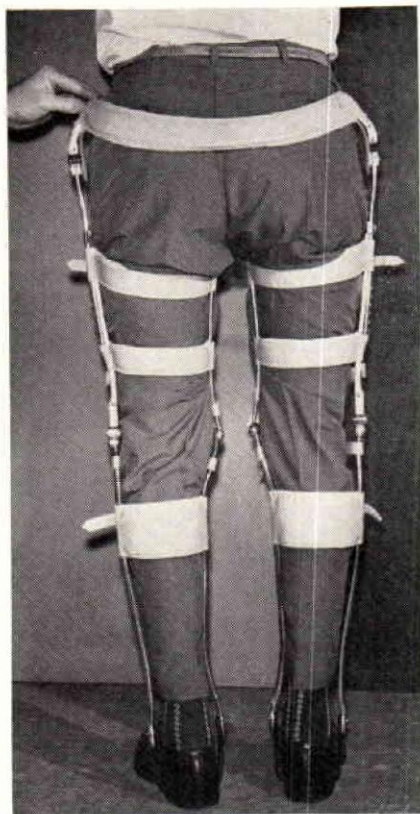


Figure III—Demonstrates the stirrup attachment and the ninety degree stop. Notice that the ankle joint of the braces is in line with the patient's ankle joint.

Figure IV—Double bar long leg braces with pelvic band and stirrup attachment. Proper fitting of the pelvic band is most important.



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For the patient who needs only long leg braces without a pelvic band, the lateral bar should extend to just below the greater trochanter and the upper thigh cuff should fit smoothly into the gluteal fold. The upper thigh cuff is ordinarily made so as not to provide ischial weight bearing from the band. A knee pad is used to prevent flexion at the knee. The calf band cuff should be full and strapped in front.

Stirrups are of forged steel with sole extension. The ankle joint is placed at the level of the patient's ankle joint and, with the usual paraplegia, we use a ninety degree stop to prevent foot drop (Figure III). For the patient who needs long leg braces and a pelvic band, the band must be well fitted with hip extensions attached to the pelvic hip joints. The hip joints on the brace should fall at the point of the patient's hip joint and possibly a quarter of an inch posteriorly.

When checking out patients with new braces, it is important to have him sit. Hip, knee and ankle joints should all be at a ninety degree angle.

In our experience, the pelvic band is very important. A lot of attention and care towards fitting the patient properly is necessary. The pelvic band should fit smoothly and rather low on the buttocks of the patient, and the band is slanted outward from above to below. The pelvic band is not horizontal. As it curves to the back, it is curved downward and tilted out (Figure IV). For those patients with lesions at D-10 or above, a back support or a spinal brace is attached to the pelvic band.

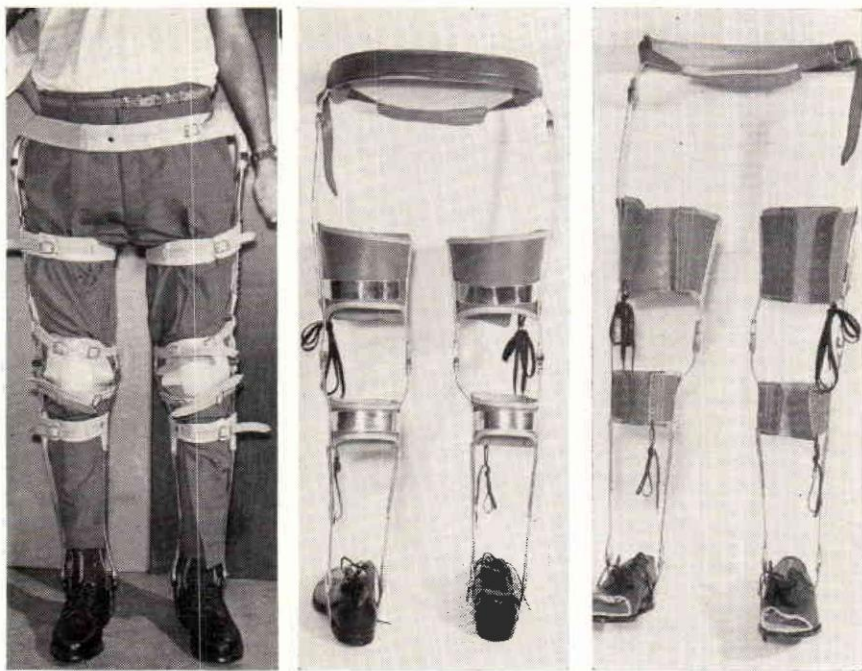


Figure V—(at left)—Front view of double bar long braces with pelvic band and stirrup attachment.

Figure VI—(center, above)—This pelvic band is horizontal and actually fits the patient around the waist so that he tends to fall through the braces and jack-knife.

Figure VII—(right, above)—Leather cuffs at thigh and calf bands are hot and lacing takes extra time.

The question of using steel or dural aluminum is decided by the patient's weight and the amount of wear and tear the patient may be expected to give the brace. It is, of course, important to make them as light as possible, but, they must be strong enough to do the job.

Specifications:

Stirrups—steel, one piece forging with sole extension.

Uprights—steel or dural aluminum, half round or edges ground.

Thigh bands—steel or aluminum.

Pelvic bands—half-round, steel.

Bars with hip lock—steel.

All leather fittings are lined with medium weight horsehide leather and the outside of the bands are covered with a good grade of leather.

Shoes for paraplegic patients should have soft toes—not a box toe—and a stiff shank. Very spastic patients should have high top shoes.

A typical prescription would be as follows:

1. Double long leg braces with pelvic band with stirrup attachment.
2. Ring lock at hip and knee.
3. Ninety degree ankle stop.

The team approach is utilized at the Institute. We have found it advisable to have a Brace Clinic, at a definite time, once a week and patients are reviewed at that time. Ordinarily, a patient has had a complete examination and evaluation with a range of motion and manual muscle test before he comes before the Brace Clinic.

At that time, the orthotist, therapist and the physician carefully examine the patient, and, after consultation, the prescription is written. After the braces have been fitted and delivered, the patient is again seen in the Clinic and checked out at that time. Any necessary adjustments are made at that time. We have found it to be very helpful to take care of minor adjustments as they occur, and, as many as 18 to 20 patients may be seen in one Clinic session.

Every patient is again checked out in the Brace Clinic just before discharge.



JOHN RETZLER

John Retzler was born in 1903. He entered the orthopedic appliance field in 1924 and in the years since then has fitted thousands of orthopedic appliances in the leading New York City hospitals. Mr. Retzler was Certified as an orthotist in 1950, holding Certificate No. 138. Throughout his career he has been associated with the Winterkorn Orthopedic Appliance Company of New York City and is now serving as Vice President of the firm.



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